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RESEARCH ARTICLE

Material Test Comparison of Pure Aluminum (Al) and Pure Aluminum-Coated (Al) with Silver (Ag) Substrat Using Electroplating Method

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Abstract: Electroplating uses aluminum material, where it's easy to obtain, lighter, and cheaper than other metals. The research goal was to determine the ability of the electric current to power aluminum (Al) coated with silver (Ag) by the electroplating method, to determine the effect of the magnitude of the electric current and the length of time the coating process took on the weight of Al coated with Ag and to determine the strength of the metal Al after tested using Brinnell test. The method used is to compare pure Al and pure Al coated with Ag by electroplating at different currents to determine the effect of the electroplating process. A Brinnell test was carried out to determine the hardness of the Al material after electroplating. The results are the amount of current that flows during the electroplating is directly proportional to the thickness of the electroplating layer attached to the Al surface. If the electroplating process uses a large current, the attached layer will look rough and not smooth, which also affects the material testing by using the Brinnell method. The Brinnell test proves that the hardness value of the Al material is directly proportional to the thickness of the layer.

Keywords: Electrical Current, Electrodeposition, Electrolyte, Metal Coating, Plating.

1. Introduction

Electroplating is a method of metal plating which is also called electrodeposition, which is a process of deposition or deposition of protective metal on metal by electrolysis (Saleh, 2014). Giving a layer to an object is adding a new element to add advantages to the object according to the desired properties (Assegaff & Purwanto, 2018). In addition to these objectives, electroplating is also able to improve the quality and aesthetic value of the product. Electroplating can be used as a means to facilitate the process of conducting electricity at the connection between metals. As for the metal coating in terms of the electrochemical properties of the coating material, it can be categorized as anodic coating and cathodic coating. Anodic coating is where the electroplating potential of the coating metal is more anodic concerning the base metal or substrate, while the cathodic coating is a coating in which the electrolytic potential of the coating metal is more cathodic for the substrate (Basmal et al., 2012).

The use of electroplating to facilitate the conduct of electricity is commonly used for conductors in Gas Insulated Switchgear (GIS). Conductors in GIS usually use aluminum as

